

foundations and literally mashed to pieces. Three of these seemed to have been pushed off their foundations in the direction of the storm's progress and **mashed**, while the fourth was rolled over, as shown by marks on the ground, and the fact that the floors were upside down. Another house was rolled over on its side and left intact.

To sum up, 6 houses were completely demolished; 8 barns were completely destroyed, and 1 rolled over; 14 houses were moved from their foundations, some only a few inches, and others 10 to 12 feet; in two cases houses fell towards each other; 2 barns were displaced; the east side of one house was torn out, probably owing to the fact that it had a square front rising above the roof; 10 houses and 2 barns were unroofed to a greater or less extent; a large pottery, south of what appeared to be the path of the tornado, had its roof torn off and carried nearly in the direction of the storm's progress; the top of the brick wall of the pottery was injured somewhat, but the north end of the building was torn out, the upper bricks being thrown a distance of 15 feet, the lower ones not so far. The appearance was that some force had pushed the wall over, while shelving immediately inside was intact. This may have been an explosion, as I could not conceive of any way in which the departing roof could give the wall such an outward shove. All prostrations of trees in the immediate path of the storm were in the direction of the storm's progress, as nearly as could be expected, considering the unequal resistance by the different roots of a tree, and by the shape and size of houses. Objects outside the path were prostrated in general toward the path and, roughly, at right angles to it. In some few cases the prostrations were almost exactly the opposite of this, and I have noticed, chiefly on the north side, that some of the trees were prostrated to the n. and nw. In no case have I found that a tree moved after it struck the ground; they were simply pushed over, one-half the roots being pulled out of the ground, the other half remaining firmly in the

ground. In the midst of fallen trees are others standing, some showing by openings in the ground, at one side, that they had experienced strong wind, while others, apparently under the same conditions, show no such evidence.

Of the material carried forward by the storm very little was left over 150 feet from the main line of the storm. Timbers and boards were left lying almost entirely lengthwise of the storm's path. Two cases are reported where south cellar doors of houses north of the storm's path were blown open. In shape the tornado cloud has been very generally described as a cone, though by no means regular in its outlines, nor do the cones described agree in shape, as they vary from the conventional cone of geometry, with wide base, to the pineapple cone. Observers state that the cloud column was not a solid column of cloud, but was made up of detached, fragmentary cloud masses. All report that the motion was counter-clockwise. Two observers saw the tornado cross streets, and using width of street as a unit of measure, the base of the cloud column had a diameter of 40 to 50 feet. Many report that its passage was attended by a noise resembling that made by a train of cars. The general conditions of the weather were: a large cloud overspread the sky from the southwest, and the wind was from the same quarter and very light. I was one-fourth of a mile north of the tornado when it passed, and there was no perceptible breeze. Inside of a minute after it passed a sharp breeze sprang up from the northwest, which died out in a short time. The lightning in the general storm was mild, and observers say that there was none in the cloud column. No hail was reported. Rain was not excessive and apparently did not change in quantity after the tornado passed. After the wind changed to northwest the clouds began to break, and the late evening was almost entirely clear. It is difficult to decide upon which side of the track the force of the storm was greater. The total amount of damage is estimated at about \$80,000. No lives were lost; three persons were seriously and several slightly injured.

INLAND NAVIGATION.

FLOODS.

The Mississippi River fell below the danger-line at Vicksburg, Miss., on the 3d, and at New Orleans, La., on the 12th. Large areas of swamp and low land in southeastern and southern La., and tracts of land in the river parishes as far north as Madison parish, La., were under water during the month. In the early part of the month melting snow in the Sierra Nevada Mountains caused the Carson River to overflow its banks, and thousands of acres of land in Ormsby and Douglas counties, Nev., were inundated. Advices dated the 7th state that great damage was caused by floods in Ontario, Canada. Railroads and dams were washed out; buildings and bridges were swept away; and much live stock was drowned. Reports of the 12th state that great damage was caused by floods in central N. Y. Large quantities of lumber and buildings were washed away by the overflow of streams, and traffic on railroads was delayed by washouts. On the 13th rivers and streams in northern Ill., and southern Wis. were overflowing their banks. At Rockford, Joliet, Elgin, Dixon, Aurora, and other places in northern Ill., great damage was done to property, and southwestern Wis. was largely inundated.

STAGE OF WATER IN RIVERS AND HARBORS.

The following table shows the danger-points at the several stations; the highest and lowest water during June, 1890, with the dates of occurrence and the monthly ranges:

Heights of rivers above low-water mark, June, 1890 (in feet and tenths).

Stations.	Danger-point on gauge.	Highest water.		Lowest water.		Monthly range.
		Date.	Height.	Date.	Height.	
<i>Red River:</i>						
Shreveport, La.	29.9	1	23.3	30	11.7	11.6
<i>Arkansas River:</i>						
Fort Smith, Ark.	22.0	5	11.2	22	2.3	8.9
Little Rock, Ark.	23.0	8	13.7	25	6.2	7.5
<i>Missouri River:</i>						
Ft. Buford, N. Dak.		7	12.3	13	7.8	4.5
Sioux City, Iowa.		7	13.5	18	9.1	4.4
Omaha, Nebr.	18.0	9	12.9	1	8.4	4.5
Kansas City, Mo.	21.0	11	17.2	1	5.9	8.3
<i>Mississippi River:</i>						
Saint Paul, Minn.	14.5	23	7.0	1	3.7	3.3
La Crosse, Wis.	24.0	15	9.7	1	7.4	2.3
Dubuque, Iowa.	16.0	26	14.2	1	7.0	7.2
Davenport, Iowa.	15.0	29	11.7	1	4.4	7.3
Keokuk, Iowa.	14.0	30	12.6	1	4.1	8.5
Saint Louis, Mo.	32.0	30	20.7	3, 4	11.6	9.1
Cairo, Ill.	40.0	1	33.1	12	21.4	11.7
Memphis, Tenn.	34.6	1	26.3	15	17.4	8.9
Vicksburg, Miss.	41.0	1	41.3	30	28.9	12.4
New Orleans, La.	13.0	1, 2, 3	13.7	30	10.7	3.0
<i>Ohio River:</i>						
Pittsburgh, Pa.	22.0	22	8.5	30	2.3	6.2
Parkersburg, W. Va.	38.0	22	16.2	14	6.0	10.2
Cincinnati, Ohio.	50.0	1	37.5	10	16.0	21.5
Louisville, Ky.	25.0	1	14.8	10	7.2	7.6
<i>Chamberland River:</i>						
Nashville, Tenn.	40.0	1	17.1	30	3.3	13.8
<i>Tennessee River:</i>						
Chattanooga, Tenn.	33.0	1	6.1	30	3.1	3.0
<i>Monongahela River:</i>						
Pittsburgh, Pa.	29.0	22	8.5	1, 30	2.3	6.2
<i>Savannah River:</i>						
Augusta, Ga.	32.0	4	9.4	30	6.1	3.3
<i>Willamette River:</i>						
Portland, Oregon.	15.0	1	17.6	29, 30	12.4	5.2

ATMOSPHERIC ELECTRICITY.

AURORAS.

Auroras were reported as follows: 7th, Lyons, N. Y. 8th, Carson, Iowa; Quakertown, Pa. 19th, Quakertown, Pa.

THUNDER-STORMS.

The more severe thunder-storms of the month are described under "Local storms." East of the Rocky Mountains thunder-storms were reported in the greatest number of states, 30 to 34, on the 5th, 6th, 11th to 15th, 18th, and 23d; in 20 to 29 on the

1st, 3d, 4th, 7th, 9th, 10th, 16th, 17th, 19th to 22d, and 24th to 30th; in 19 on the 2d; and in 14 on the 8th.

East of the Rocky Mountains thunder-storms were reported on the greatest number of dates, 30, in Fla., N. C., and Tenn.; on 20 to 29 in Ala., Ga., Ill., Ind., Iowa, Kans., Ky., La., Mich., Minn., Miss., Mo., Mont., Nebr., N. Y., N. Dak., Pa., S. C., S. Dak., Tex., and Wis.; on 10 to 19 in Ark., Md., Mass., N. H., N. J., R. I., Vt., Va., and W. Va.; and on 1 to 9 in Conn., D. C., Ind. T., Me., and S. C. West of the Rocky